

# Guitar Technical Services

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## Hums and Buzzes on Electric Guitars & Basses

Very often customers will use the word 'hum', 'buzz' or even 'rattle' to describe an electrical problem with their guitar. In my world, I would use the words, buzz or rattle to describe problems arising from frets, hardware, saddle or nut. These noises only tend to occur when the string is played.

### Hum

This is the word I use for electrical problems, although I do accept that a hum can sound like a buzzing bumblebee at times. The main difference is that a hum will be constant whether the string is being played or not. It is caused by the electrical frequency of 50 or 60 Hz depending on what part of the world you live in. The frequency range is quite low but can be very annoying.

I often get phone calls and e-mails asking about a problem relating to hum. Usually, customers think that they must have an earthing fault because, when they touch anything metal or touch the strings, the hum dies down or disappears. However, this is not the case because there is a wire attached to the bridge /strings, which runs to the earth shield and Volume/Tone pots and the reason for this wire is to reduce the hum when a person touches the strings or any metal part of the guitar. In fact, the guitar player becomes part of the electrical circuit!

After the customer has described the situation - how when he touches the strings the hum goes away - I have to explain that I am not being flippant or sarcastic when I say that is fine and normal because:

- a) you cannot play the guitar without touching the strings ! and
- b) the description tells me that the string earth wire is actually working correctly

### Safety Precautions

At this stage, I need to point out the necessary use of a circuit-breaker between your amplifier and the mains supply. Because you're expected to touch the earth shield to reduce hum, that leaves you open to being electrocuted if the mains electricity or other equipment such as PA systems and microphone/mixing desks are incorrectly wired. Circuit breakers are relatively cheap and could save your life. An alternative is a clever capacitor/resistor combination that can be put in line (inside the guitar) from the string-earth wire to the pots. This will reduce the effects of any high-voltage shock down to a minor skin-stinging one - just enough to let you know something's wrong. This filter is not normally fitted to guitars but is a simple DIY modification. I personally prefer the use of a circuit breaker because it also protects the amp.

### Reducing hum

Guitar pickups fall into 2 categories: Active and Passive systems.

**Active Pickup Systems** usually use low impedance pickups and a pre-amp/EQ system. These often tend to be quiet or have greatly reduced hum.

**Passive pickup Systems** are sub-divided into Single Coil and Humbuckers.

**Single coil pickups** are the worst offenders for giving off hum.

**Humbuckers** are actually made up of two single coils that are fitted together to reduce the amount of hum, hence the name humbucker - i.e. 'bucking the hum'!

One thing that will cause an increased hum is the use of distortion or overdrive effects or channels that can make your guitar sound like it is sizzling/frying chicken.





### Reducing the Amount of Hum

Sometimes the hum is greater just because you happen to have a drier than average skin. Other people with more moist skin create a better connection with the strings - they actually conduct electricity better so the string-earth wire reduces the hum more.

If your guitar is too close to other forms of electrical fields it can make matters worse. Things to look out for are:

- Strobe Lighting
- Dimmer switches
- Fluorescent lighting tubes and lamps
- Television and computer monitors
- Guitar amplifiers and speaker cabinets.

In fact, anything that is electrical may have an effect when in close proximity to your guitar. One customer wrote to me saying he had discovered his noise/hum was caused by his neighbours Computer Monitor – through the wall! So, for those of you that often sit close to your computer for recording or sit on top of your amp, you now know why there is so much hum coming from your guitar!

Shielding the inside of the cavities of the guitar with either metal tape or nickel shielding paint is effective in reducing the noise but may not get rid of it completely.

### Other Options

To kill hum completely, there are two options apart from giving up playing guitar.

1. A noise gate is a guitar effect, which is used to control the threshold of noise produced. They usually have 2 controls:
  - a) a threshold for the beginning of sound and
  - b) one for the end of your throughput of sound.
 By adjusting the IN threshold, your sound is switched on when you hit the first note on the guitar string. The signal OUT threshold adjusts the amount of sustain the note is allowed to have before shutting off to complete quiet. The drawback is that your quieter sounds could be shut-off prematurely, completely ruining the subtlety in the music you're trying to express. On the up side, the IN threshold often has other controls that allow progressive 'fade in' which sound like 'automatic violining' - where your volume increases but you cannot hear the attack of the note.
2. AB switches are floor switches that can be used in a manual way like the noise gate. Normally they are used to switch from one amp to another but, by putting your guitar through the box where 'A' goes to your amplifier and 'B' is left unconnected, you are then able to manually press the switch when you want to play and press it again when you've finished.

NB: Although I stated 'To kill hum completely', there is no such thing. What happens is, the notes played are just louder than the residual hum – the hum is always there to some degree!

Should you get hum on an acoustic guitar fitted with a transducer and have no sound from it, this usually means that the transducer is broken - these are irreparable.

